Catalog SRA 67

BREEZE

Standard and Custom

SLIP RING ASSEMBLIES AND ROTARY SWITCHES

Designed and produced by

BREEZE MARK

BREEZE CORPORATIONS, INC.

700 Liberty Avenue, Union, N. J. 07083 • Telephone: (201) 686-4000

Standard and Custom SLIP RING ASSEMBLIES

BREEZE MARK SLIP RING ASSEMBLIES

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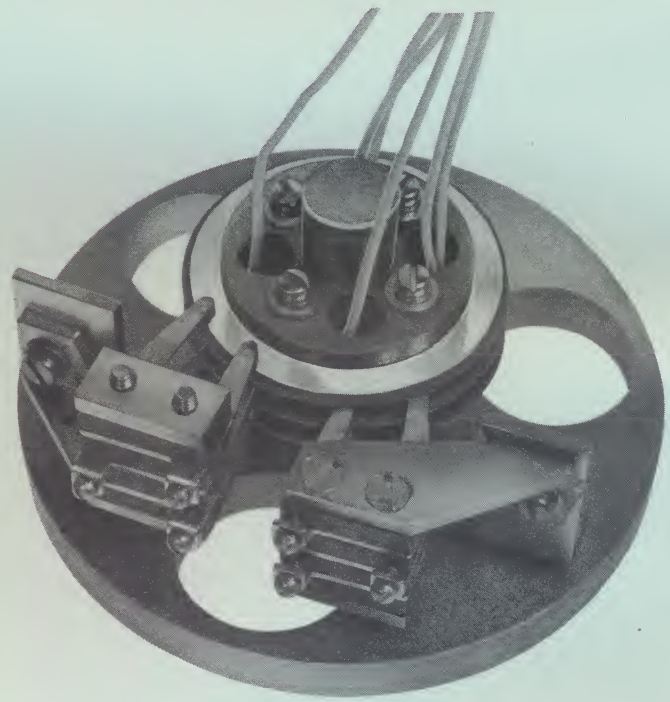
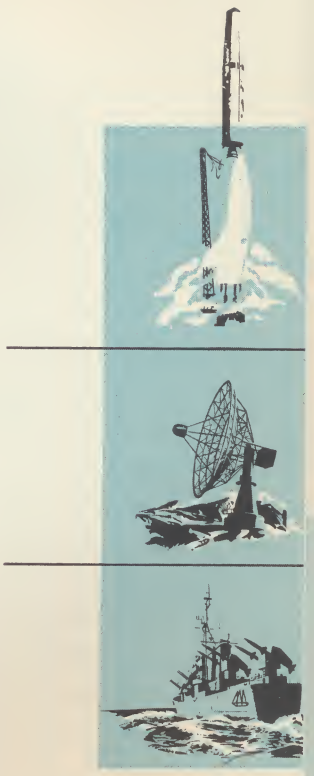


SECTION

1

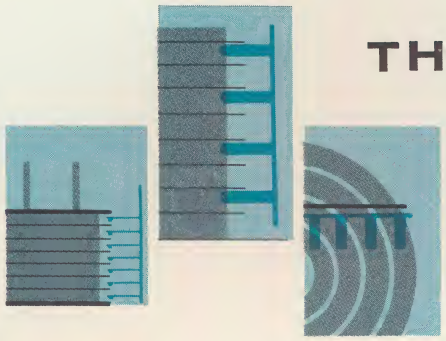
APPLICATION AND FUNCTION

Slip ring assemblies are electro-mechanical units which provide the only well-established means of transferring electrical energy from stationary to rotating structures where the use of wires or cables is not feasible. They are used in rotating radar antenna systems, for fire control, missile guidance and tracking, meteorological survey, stress and temperature analysis and in many other applications where electrical connections must be maintained between stationary and rotating units.



SECTION

1



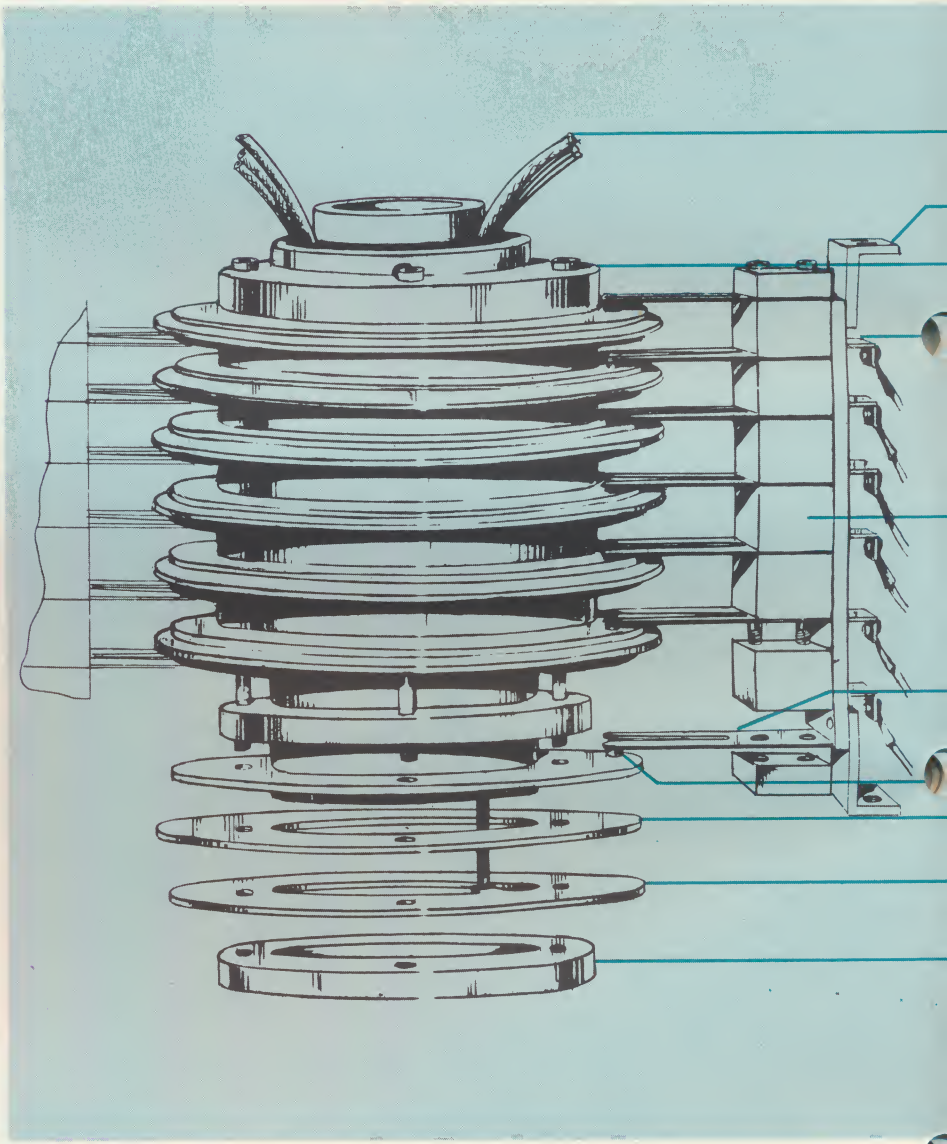
THREE TYPES OF SLIP RING

There are three basic types of slip ring assemblies: flat, cylindrical and concentric.

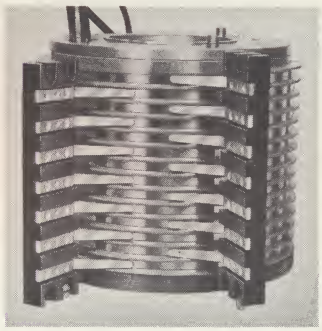
A typical flat ring assembly consists of slip rings (A), flat discs made from silver alloys. Rings are mounted in pairs, above and below insulating barriers (B) which are, in turn, separated by insulating spacers (C). These components are bolted to a mounting flange (D). Lead wires (E) are attached to the slip rings.

Making contact with each ring is a brush (F) made of silver graphite which, in combination with the silver alloy ring, provides the desired electrical conductivity, low contact resistance and low wear rate. Brush contacts are welded to beryllium copper springs (G) assembled with insulating spacers (H) and terminals (1) and bolted together between mounting brackets (J).

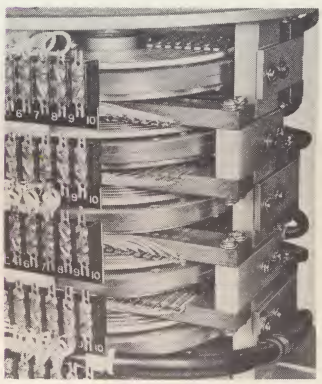
The slip ring assembly can be packaged as a self-contained unit complete with bearings, seals and housing.



ASSEMBLIES



Cylindrical Assembly: In this type of assembly the rings are stacked vertically around a shaft and the brush contact is made on the vertical rather than the horizontal plane.



Concentric Assembly: This assembly consists of rings having various diameters mounted concentrically on a flat insulating support plate. The concentric assembly can be made in multiples and stacked vertically with space between the sections for the brushes.

Slip ring assemblies can handle many types of circuits ranging from microvolts to over 75 kilovolts, currents from microamps to amperages above 2000 amperes and frequencies from d.c. to 150 megacycles. The rings can be segmented to permit switching and thus perform programming and telemetering functions.

Slip ring circuits are comparable to continuous wires or cables in several respects. Crosstalk between circuits is similar to that experienced with shielded cable. Contact and brush resistance is lower than the resistance of wire leads and under operating conditions noise is a function of current and generally is negligible.

SECTION

2

SLIP RING ASSEMBLIES FOR SWITCHING

Segmented ring assemblies can provide for a large number of switching circuits in a compact design.

Uses and Capacities

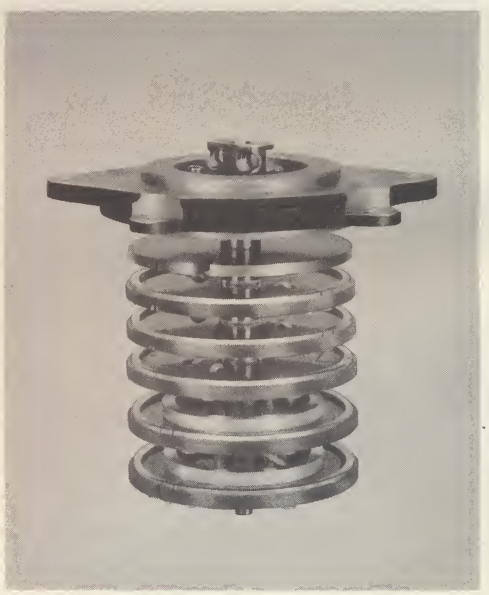
Slip ring assemblies with segmented rings have been successfully used in a large number of interrupted circuit designs such as radar and sonar pulsing, telemetry circuit sampling, timers, etc. One of the major advantages of this approach is the capability of the slip ring assembly to provide a large number of circuits in a small package with great accuracy. Units have been produced which accommodate well over 600 separate circuits.

Switching applications may require operation at rotational speeds as high as 10,000 rpm. Phasing accuracy is extremely important, and specifications requiring 0°20′ electrical, and .005″ mechanical have been met. To eliminate brush bounce and ensure long brush life, the rings are fabricated as flush circuits with the proper dielectric material filling the gaps between ring segments.

Slip ring assemblies for switching are generally made to specific customer requirements. They may be break-before-make or make-before-break types. In stepping switches the potential difference between poles can be as high as 3000 volts or greater.

Roller Type Brush

One of the most recent improvements is the development of the "roller brush" by Breeze. Designed primarily for switching applications, this new brush achieves high accuracies when used with segmented rings. Working on the principle of point contact, extremely close tolerances are possible. In addition, the problems of cocked brushes, smear and wear have been eliminated.



METHODS OF PRODUCTION

RING MATERIALS

BRUSHES

Slip ring assembly design is based on the customers' electrical and mechanical specifications. Performance, economy of space, weight and manufacturing costs are the foremost considerations.

Methods of Production

Breeze utilizes the two proven methods of producing slip ring assemblies: (fabrication and plastic molding. (1) FABRICATION. Individual components and sub-assemblies — rings, insulators, spacers, brush leaves, brush blocks, and lead wires are assembled to produce the fabricated unit. (2) PLASTIC MOLDING. Rings with leads attached are inserted in a mold. The plastic material, thermosetting or epoxy type, is injected and flows around the leads and rings to produce an integral unit. The rings then are machined to the proper size and finish.

Slip Ring Materials

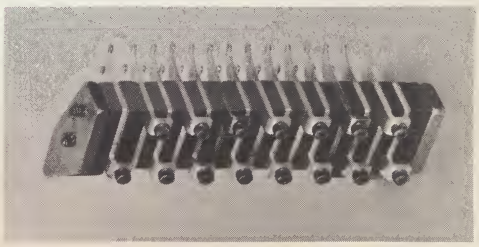
Slip ring materials are chosen for their conductivity, wear rates, and resistance to oxidation. Coin silver is generally preferred. In some critical applications, rhodium-plate is used because of its high wear resistance, high corrosion resistance, and excellent electrical conductivtiy.

Brushes

The requirements for brushes are low or negligible electrical noise, low static contact resistance, high brush material conductivity, and low rate of wear. Brush contact materials are usually sintered silver-graphite. The silver provides the low contact and brush resistance, and the graphite provides lubrication for long wear. Under the vacuum conditions of high altitudes or outer space, additional lubricating methods are used to provide the required brush life.

Depending on current requirements and available space, brushes may be either the spring-loaded motor type or the cantilever type. The cantilever type is generally used for currents up to approximately 75 amperes, and the motor type for currents from approximately 75 amperes and over. Special brush materials are used on small diameter slip ring assemblies. These brushes must be fabricated so that they exhibit the proper spring rate to maintain the necessary contact pressure on the slip ring.

Brush assemblies are secured to an insulating brush block. To conserve space, the brush block can be used as a terminal board for the brush lead wires.



SECTION

4

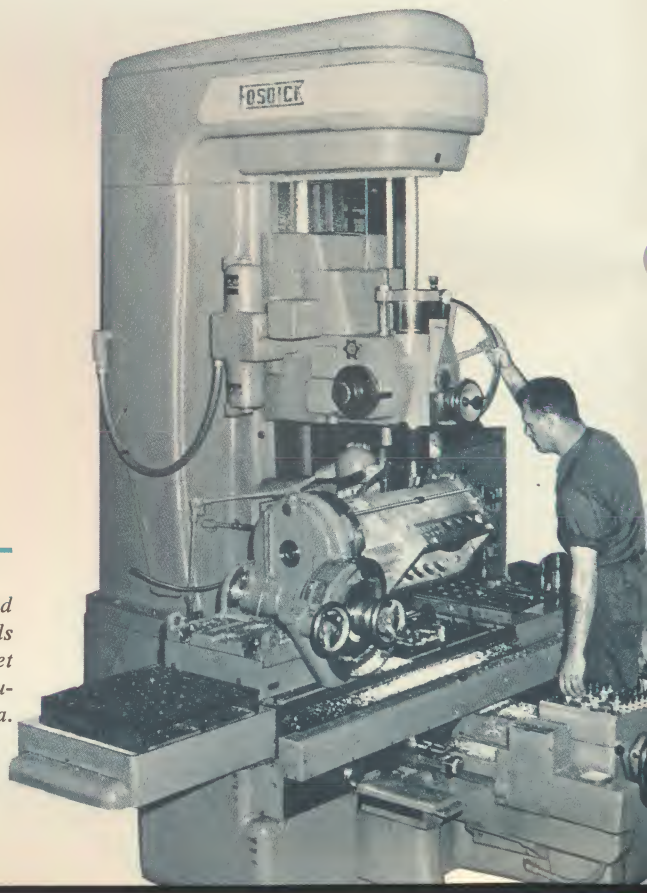
CAPABILITIES AND FACILITIES

Breeze Corporations, Inc., is a well-rounded and diversified development and manufacturing operation specializing in the design and manufacture of electrical, electro-mechanical and hydromechanical components and systems and formed metal products for the military and commercial markets.

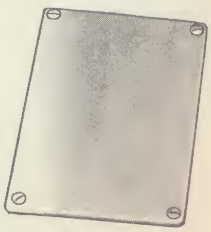
Breeze, as an integrated facility, retains complete control over the design, engineering and production of the slip rings discussed in this publication.

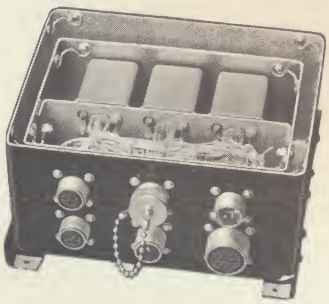
The plant facilities related to the production of slip ring assemblies are:

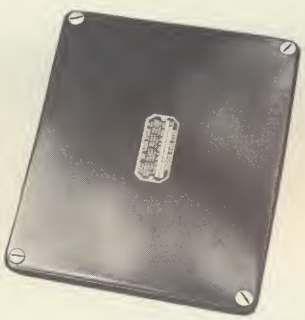
- Precious metals plating shop
- Epoxy resin casting department
- Metallurgical laboratory
- Chemical laboratory
- Environmental test laboratory
- Electrical test laboratory
- Mechanical test laboratory
- Shops for the production of tools and prototypes
- Production plant which includes single-purpose tools for slip rings that are special or few in number and mass-production equipment for the standard units



Breeze is qualified under MIL-Q-5923 and MIL-Q-9858 for quality control and holds a valid Security Clearance at the Secret level under the security laws and regulations of the United States of America.







RESPONSIBILITIES AND PERFORMANCE

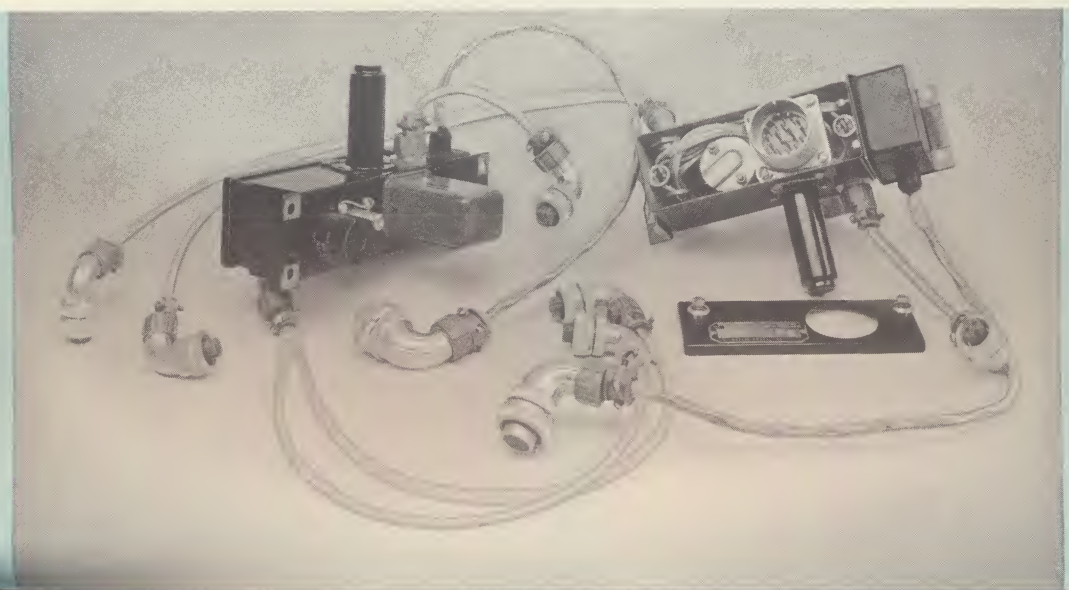
in electrical, electro-mechanical and hydro-mechanical components and systems and fabricated metal products

Breeze Corporations, Inc., for more than 34 years, has manufactured a wide range of electrical, electro-mechanical and hydro-mechanical components and systems and fabricated metal products for the aircraft, military and automotive industries.

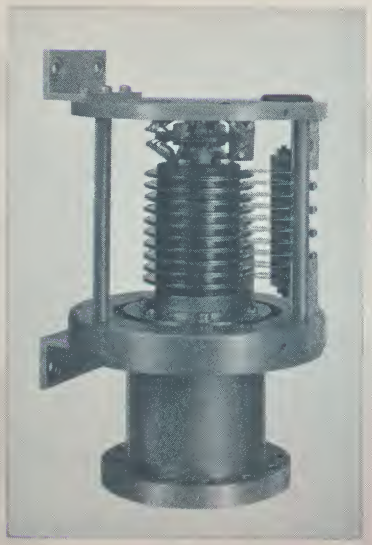
From the beginning, the corporations have progressively developed into an engineering-manufacturing organization concerned almost exclusively with defense activities.

As an added assist for slip ring assembly projects, Breeze Corporations, Inc. has manufactured approximately 8000 custom control packages from over 100 designs conceived by staff engineers for programmed systems which include all types of sensing and actuating devices. These systems serve to indicate and/or control a variety of functions ranging from automatic gas turbine afterburner operation through fire control equipment test. Some are completely automatic, some only partially so; some respond to several variables, some to only one. To design and build these systems, Breeze engineers have had to develop new components, miniaturize existing equipment, work with electrical, electronic, mechanical, hydraulic and pneumatic systems and often with complex combinations of these.

Shown are three examples of custom control packages designed and manufactured by Breeze. These will indicate the character and scope of contract responsibilities handled in this area.



STANDARD SLIP RING ASSEMBLIES



An analysis covering many thousands of custom slip ring assemblies produced by Breeze Corporations during the past twenty years has shown that a substantial number of these requirements have been for assemblies having similar size and operating characteristics.

NOW... to meet these repetitive requirements more rapidly and at lower costs, Breeze offers seven standard size slip rings with ring envelope diameters from 1″ through 10½″.

FEATURES

- Ring Envelope Diameters: 1″, 1¾″, 2⅝″, 3¾″, 4⅞″, 7¼″, 9$^{11}/_{16}$″, 10⅝″.
- Hard coin silver rings and silver graphite brushes for excellent electrical properties and long life.
- Fabricated construction:
  - (1) Provides superior resistance to shock, vibration, environmental conditions.
  - (2) Permits addition of rings when required.
- Flat stacked ring assembly with rings mounted above and below each barrier provides maximum number of rings in shortest axial length for rated capacities.
- Assemblies can be stacked on a common shaft to produce a multiple unit.
- Assemblies can be furnished with shielded wires on special request.

SPECIFICATIONS

Ring: Coin silver. Surface hardness 115 Brinell minimum. Surface finish less than 16 micro-inches. Rings positively keyed against rotation or radial movement.

Brush: Leaf material, heat treated beryllium copper. Brush material, silver graphite. Minimum brush life at 1000 FPM, 600 hr.; at 250 FPM, 2000 hr.

Insulator: Plastic per MIL-P-15047 and MIL-M-14E. Insulation resistance: 100 megohms minimum. Breakdown, 1500 volts RMS for one minute minimum.

Ambient Temperature: –60°F to 165°F continuous, 200°F intermittent.

Brush Generated Noise: 100 microvolts at a current of 50 milliamperes (2 contacts per ring), 50 microvolts at a current of 50 milliamperes (4 contacts per ring).

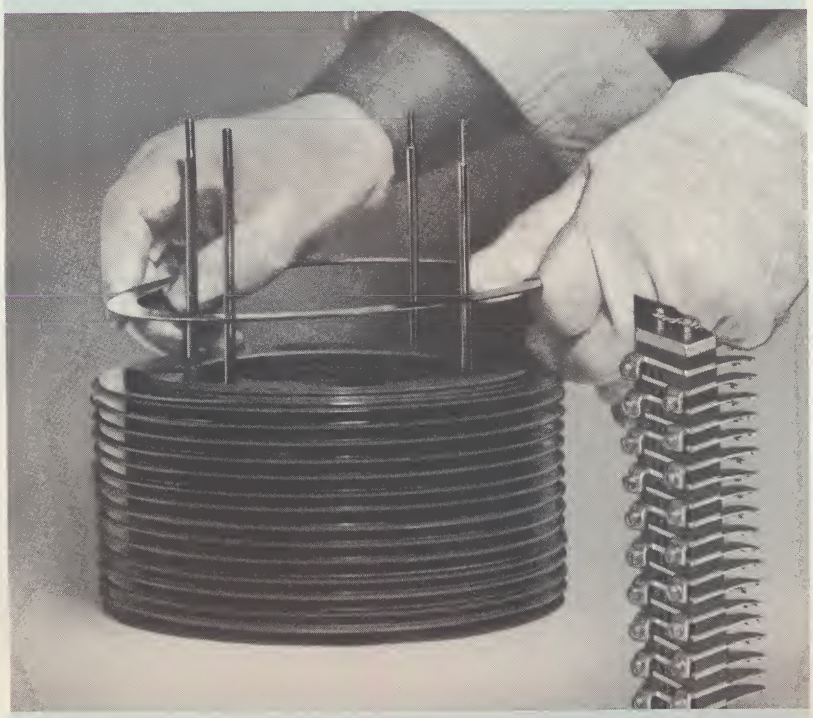
Termination:

Ring — all series, 24″ of white numbered leads, per MIL-W-16878, Type E.

Brush — series 8001 and 8002, solder lug. Other series, screw type.

Speed of Rotation: To 2,000 RPM — normal. (Consult factory for higher requirements.)

Ratings: See respective details on following pages.

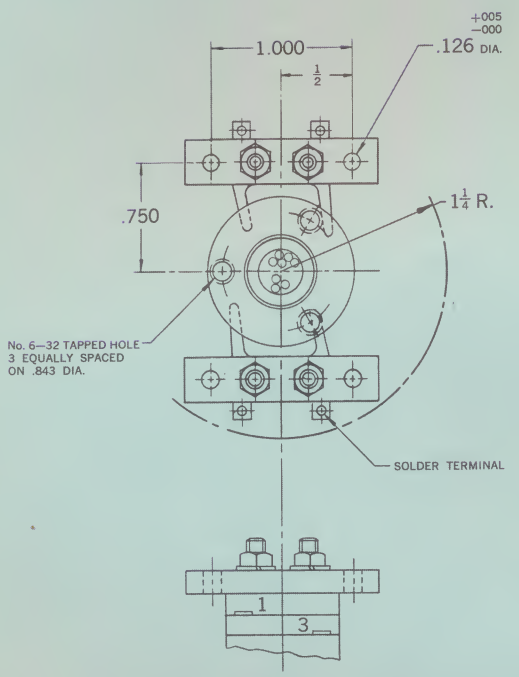


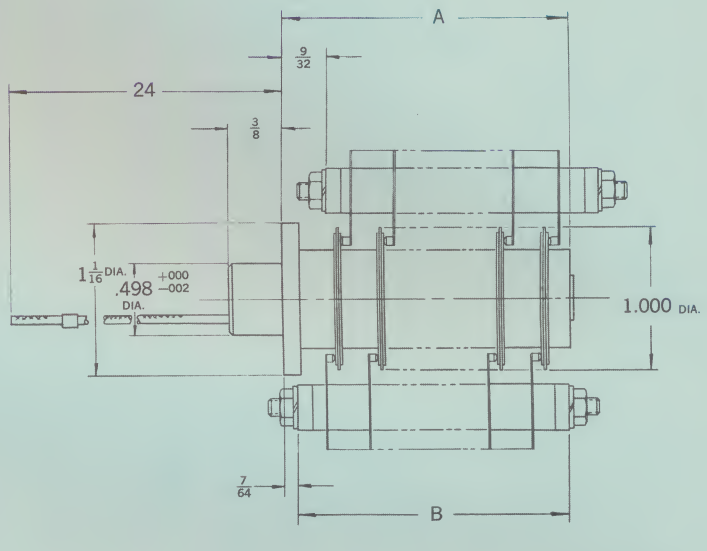
NOTE:
The designs represented by these specifications are the property of Breeze Corporations, Inc., and may not be used, reproduced or improperly divulged without the express written authority of Breeze Corporations, Inc.

THE FOLLOWING PAGES SHOW DETAILED DRAWINGS AND SPECIFICATIONS FOR THESE EIGHT STANDARDS

STANDARD SLIP RING ASSEMBLIES

AJ-8001



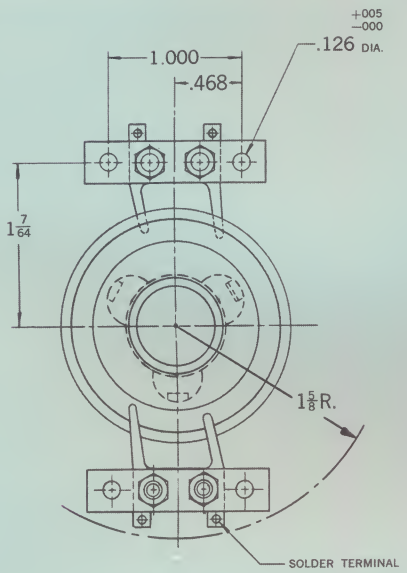


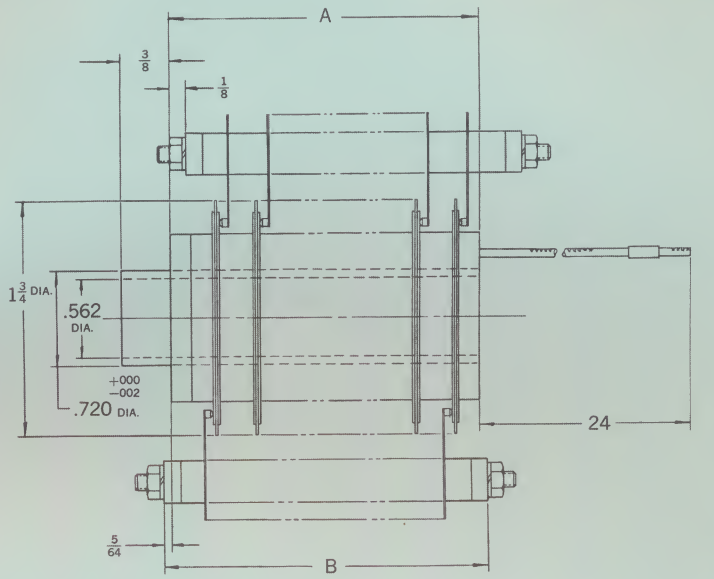
NOTES:

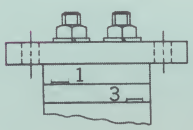
1. Max. operating characteristics: (a) Voltage—300 RMS. (b) Current—5 Amperes continuous. (c) Speed of rotation—2000 RPM.
2. Wire leads are 20 gage per spec. Mil-W-16878 Type E Teflon. Other wire sizes and types are available upon request.
3. Available as two (2) brush block assembly only.
4. Brush contact pressure to be 14 to 30 grams.

BREEZE PART No. 2 contacts	no. of rings	A	B	BREEZE PART No. 2 contacts	no. of rings	A	B
AJ-8001-2	2	25/32	1/2	AJ-8001-12	12	1 19/32	1 9/32
AJ-8001-4	4	31/32	21/32	AJ-8001-14	14	1 3/4	1 7/16
AJ-8001-6	6	1 1/8	13/16	AJ-8001-16	16	1 29/32	1 19/32
AJ-8001-8	8	1 1/4	31/32	AJ-8001-18	18	2 1/16	1 3/4
AJ-8001-10	10	1 7/16	1 1/8	AJ-8001-20	20	2 3/32	1 29/32

AJ-8002







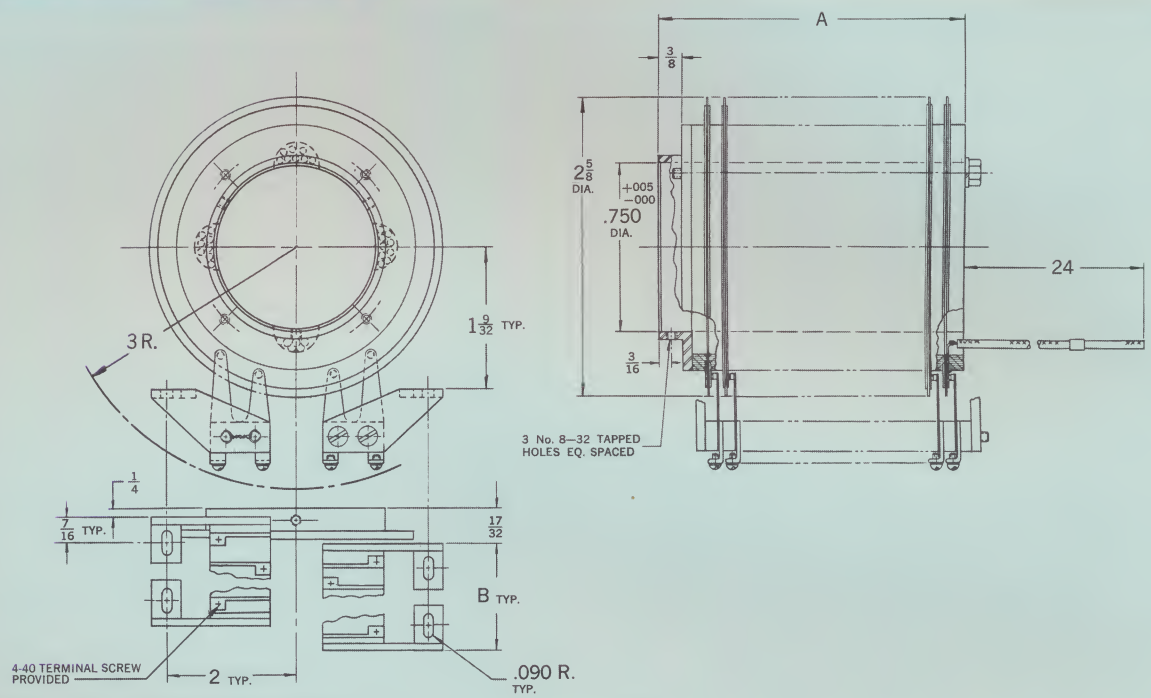
NOTES:

1. Max. operating characteristics: (a) Voltage—300 RMS. (b) Current—5 Amperes continuous. (c) Speed of rotation—2000 RPM.
2. Wire leads are 20 gage per spec. Mil-W-16878 Type E Teflon. Other wire sizes and types are available upon request.
3. For four (4) brush contacts per ring add two (2) brush block assemblies at 90° from position shown.
4. Brush contact pressure to be 14 to 30 grams.

BREEZE PART No.		no. of rings	A	B	BREEZE PART No.		no. of rings	A	B
2 contacts	4 contacts				2 contacts	4 contacts			
AJ-8002-2	AJ-8002-A2	2	25/32	19/32	AJ-8002-14	AJ-8002-A14	14	2 1/32	1 27/32
-4	-A4	4	1	13/16	-16	-A16	16	2 1/4	2 1/16
-6	-A6	6	1 7/32	1	-18	-A18	18	2 7/16	2 1/4
-8	-A8	8	1 13/32	1 7/32	-20	-A20	20	2 23/32	2 15/16
-10	-A10	10	1 5/8	1 7/16	-22	-A22	22	2 7/8	2 21/32
-12	-A12	12	1 13/16	1 5/8	-24	-A24	24	3 1/16	2 7/8

STANDARD SLIP RING ASSEMBLIES

AJ-8003

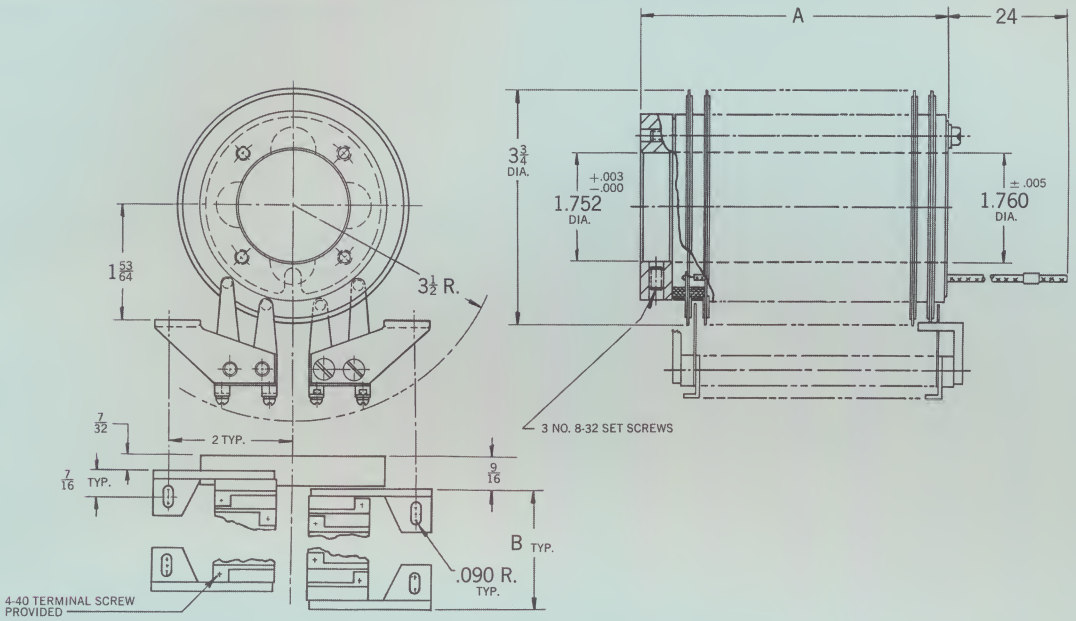


NOTES:

1. Max. operating characteristics: (a) Voltage—300 RMS. (b) Current—10 Amperes continuous. 20 Amperes continuous with 12 gage cable. (c) Speed of rotation—1500 RPM.
2. Wire leads are 16 gage per spec. Mil-W-16878 Type E Teflon. Other wire sizes and types are available upon request.
3. For four (4) brush contacts per ring add two (2) brush block assemblies at 180° from position shown.
4. Brush contact pressure to be 1½ to 3½ oz.
5. For less than eight (8) rings one (1) mounting bracket is used per brush block assembly.

BREEZE PART No.		no. of rings	A	B	BREEZE PART No.		no. of rings	A	B
2 contacts	4 contacts				2 contacts	4 contacts			
AJ-8003-2	AJ-8003-A2	2	1 1/16	13/16	AJ-8003-18	AJ-8003-A18	18	3 5/16	3 1/16
-4	-A4	4	1 11/32	1 3/32	-20	-A20	20	3 19/32	3 11/32
-6	-A6	6	1 5/8	1 3/8	-22	-A22	22	3 7/8	3 5/8
-8	-A8	8	1 29/32	1 21/32	-24	-A24	24	4 5/32	3 29/32
-10	-A10	10	2 3/16	1 15/16	-26	-A26	26	4 7/16	4 3/16
-12	-A12	12	2 15/32	2 7/32	-28	-A28	28	4 23/32	4 15/32
-14	-A14	14	2 3/4	2 1/2					
-16	-A16	16	3 1/32	2 25/32	-30	-A30	30	5.0	4 3/4

AJ-8004



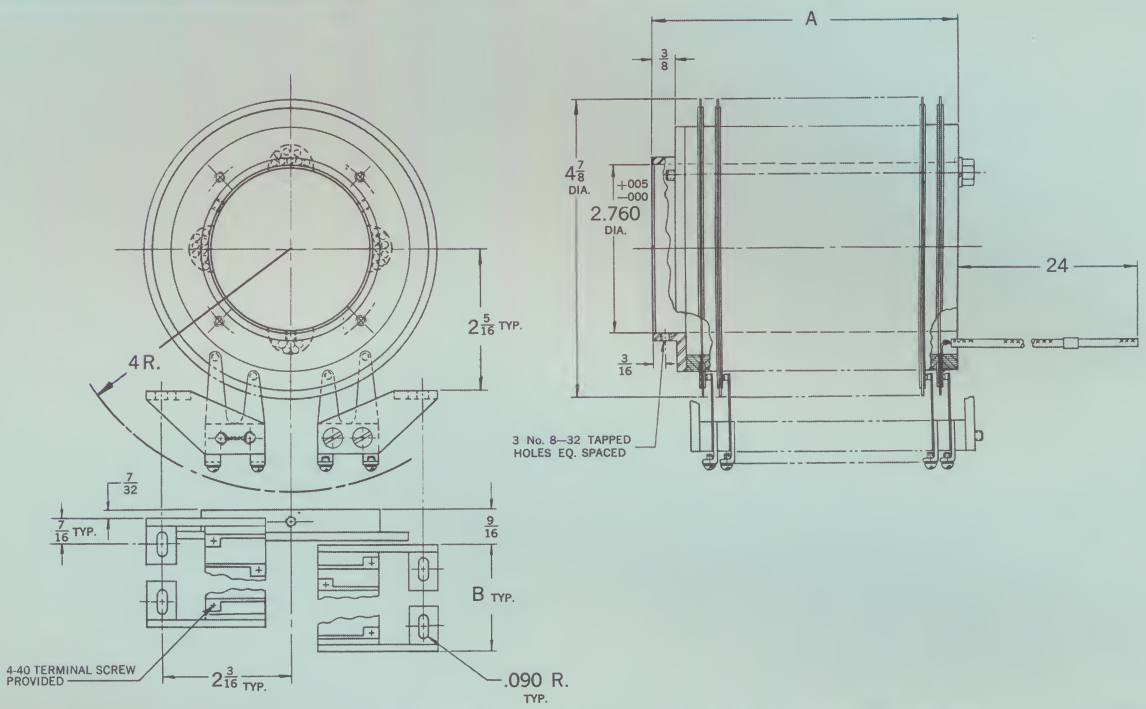
NOTES:

1. Max. operating characteristics: (a) Voltage—300 RMS. (b) Current—10 Amperes continuous. 20 Amperes continuous with 12 gage cable. (c) Speed of rotation—1500 RPM.
2. Wire leads are 16 gage per spec. Mil-W-16878 Type E Teflon. Other wire sizes and types are available upon request.
3. For four (4) brush contacts per ring add two (2) brush block assemblies at 180° from position shown.
4. Brush contact pressure to be 1½ to 3½ oz.
5. For less than eight (8) rings one (1) mounting bracket is used per brush block assembly.

BREEZE PART No.		no. of rings	A	B	BREEZE PART No.		no. of rings	A	B
2 contacts	4 contacts				2 contacts	4 contacts			
AJ-8004-2	AJ-8004-A2	2	1 1/16	13/16	AJ-8004-18	AJ-8004-A18	18	3 5/16	3 1/16
-4	-A4	4	1 11/32	1 3/32	-20	-A20	20	3 19/32	3 11/32
-6	-A6	6	1 5/8	1 3/8	-22	-A22	22	3 7/8	3 5/8
-8	-A8	8	1 29/32	1 21/32	-24	-A24	24	4 5/32	3 29/32
-10	-A10	10	2 3/16	1 15/16	-26	-A26	26	4 7/16	4 3/16
-12	-A12	12	2 15/32	2 7/32	-28	-A28	28	4 23/32	4 15/32
-14	-A14	14	2 3/4	2 1/2	-30	-A30	30	5.0	4 3/4
-16	-A16	16	3 1/32	2 25/32					

STANDARD SLIP RING ASSEMBLIES

AJ-8005

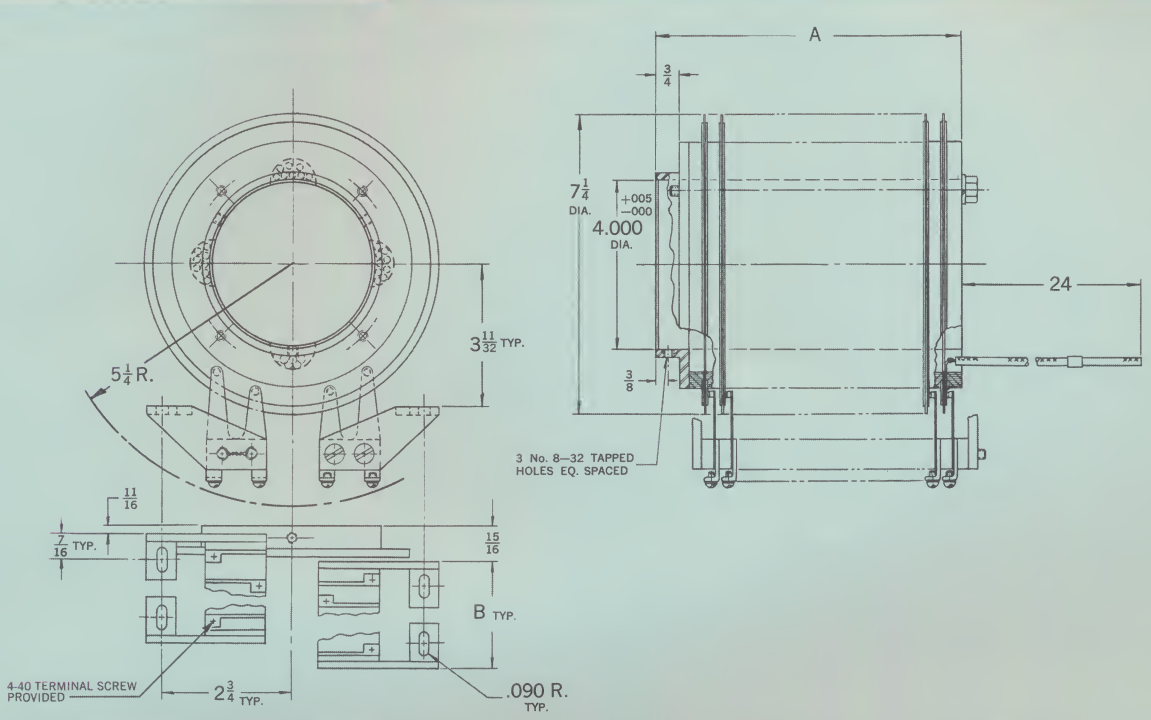


NOTES:

1. Max. operating characteristics: (a) Voltage—300 RMS. (b) Current—10 Amperes continuous. 20 Amperes continuous with 12 gage cable. (c) Speed of rotation—1500 RPM.
2. Wire leads are 16 gage per spec. Mil-W-16878 Type E Teflon. Other wire sizes and types are available upon request.
3. For four (4) brush contacts per ring add two (2) brush block assemblies at 180° from position shown.
4. Brush contact pressure to be 1½ to 3½ oz.
5. For less than eight (8) rings one (1) mounting bracket is used per brush block assembly.

BREEZE PART No.		no. of rings	A	B	BREEZE PART No.		no. of rings	A	B
2 contacts	4 contacts				2 contacts	4 contacts			
AJ-8005-2	AJ-8005-A2	2	1 1/16	13/16	AJ-8005-18	AJ-8005-A18	18	3 5/16	3 1/16
-4	-A4	4	1 11/32	1 3/32	-20	-A20	20	3 19/32	3 11/32
-6	-A6	6	1 5/8	1 3/8	-22	-A22	22	3 7/8	3 5/8
-8	-A8	8	1 29/32	1 21/32	-24	-A24	24	4 5/32	3 29/32
-10	-A10	10	2 3/16	1 15/16	-26	-A26	26	4 7/16	4 3/16
-12	-A12	12	2 15/32	2 7/32	-28	-A28	28	4 23/32	4 15/32
-14	-A14	14	2 3/4	2 1/2	-30	-A30	30	5.0	4 3/4
-16	-A16	16	3 1/32	2 25/32					

AJ-8007

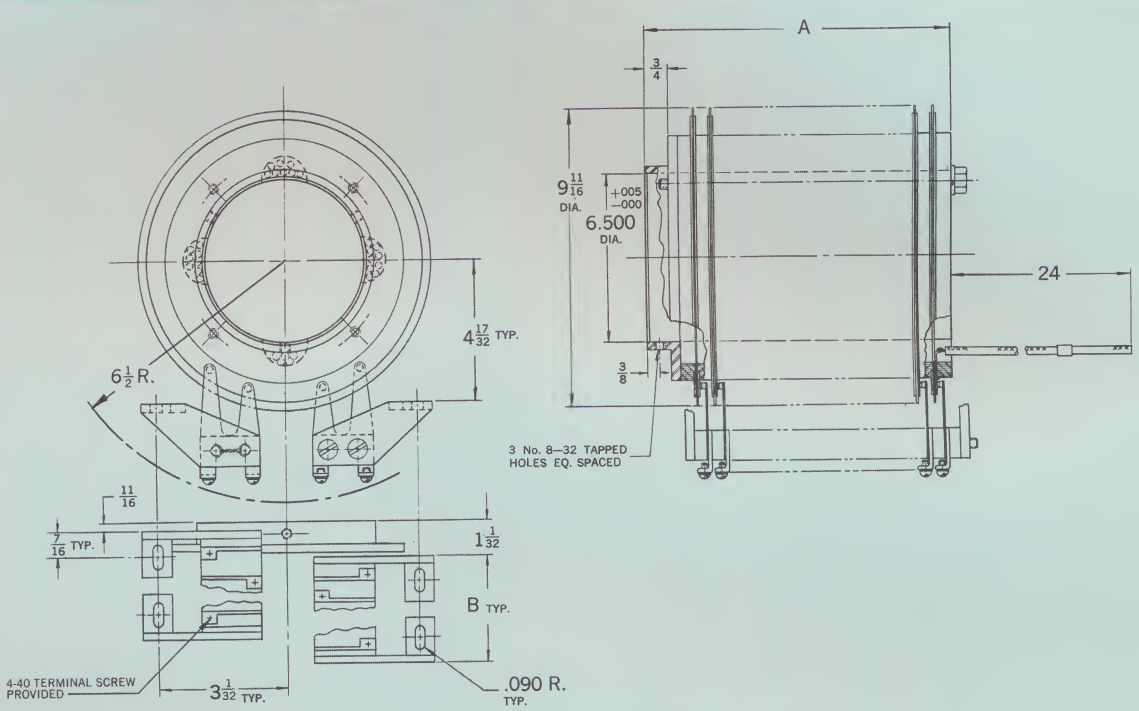


NOTES:

1. Max. operating characteristics: (a) Voltage—200 RMS. (b) Current—10 Amperes continuous. 20 Amperes continuous with 12 gage cable. (c) Speed of rotation—1500 RPM.
2. Wire leads are 16 gage per spec. Mil-W-16878 Type E Teflon. Other wire sizes and types are available upon request.
3. For four (4) brush contacts per ring add two (2) brush block assemblies at 180° from position shown.
4. Brush contact pressure to be 1½ to 3½ oz.
5. For less than eight (8) rings one (1) mounting bracket is used per brush block assembly.

BREEZE PART No.		no. of rings	A	B	BREEZE PART No.		no. of rings	A	B
2 contacts	4 contacts				2 contacts	4 contacts			
AJ-8007-2	AJ-8007-A2	2	1 7/16	13/16	AJ-8007-18	AJ-8007-A18	18	3 5/16	2 21/32
-4	-A4	4	1 21/32	1 1/32	-20	-A20	20	3 17/32	2 29/32
-6	-A6	6	1 29/32	1 9/32	-22	-A22	22	3 25/32	3 1/8
-8	-A8	8	2 1/8	1 1/2	-24	-A24	24	4.0	3 3/8
-10	-A10	10	2 3/8	1 3/4	-26	-A26	26	4 7/32	3 19/32
-12	-A12	12	2 19/32	1 31/32	-28	-A28	28	4 15/32	3 27/32
-14	-A14	14	2 27/32	2 3/16	-30	-A30	30	4 11/16	4 1/16
-16	-A16	16	3 1/16	2 7/16					

AJ-8890

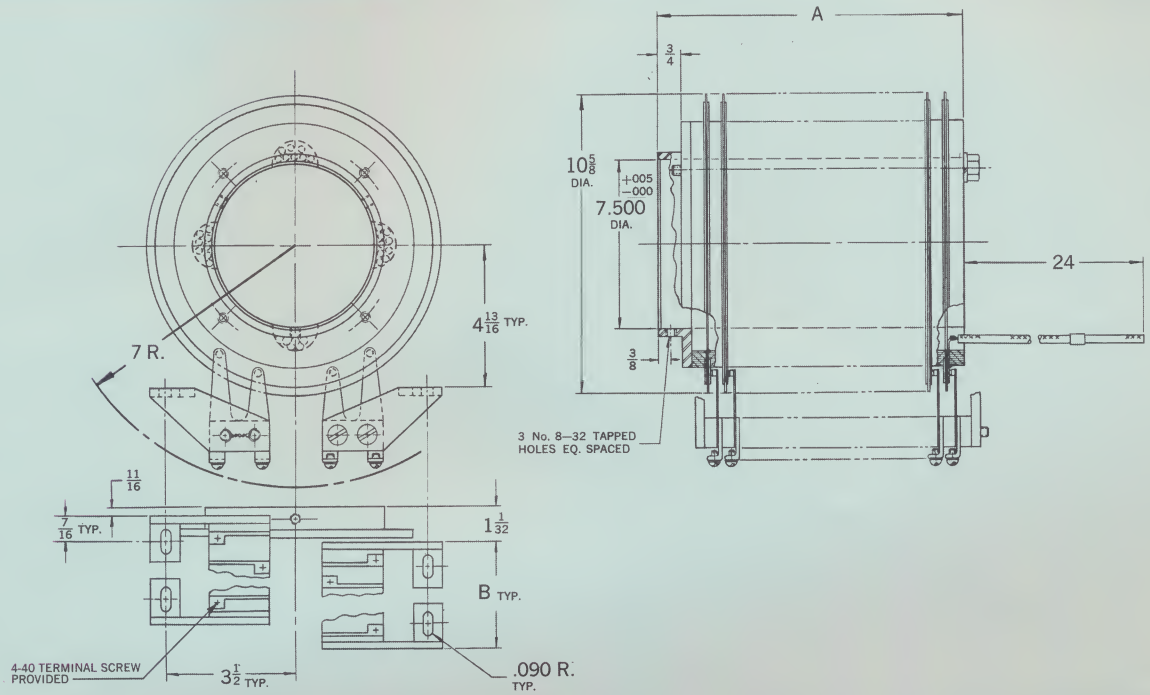


NOTES:

1. Max. operating characteristics: (a) Voltage—300 RMS. (b) Current—10 Amperes continuous. 20 Amperes continuous with 12 gage cable. (c) Speed of rotation—1500 RPM.
2. Wire leads are 16 gage per spec. Mil-W-16878 Type E Teflon. Other wire sizes and types are available upon request.
3. For four (4) brush contacts per ring add two (2) brush block assemblies at 180° from position shown.
4. Brush contact pressure to be 1½ to 3½ oz.
5. For less than eight (8) rings one (1) mounting bracket is used per brush block assembly.

BREEZE PART No.		no. of rings	A	B	BREEZE PART No.		no. of rings	A	B
2 contacts	4 contacts				2 contacts	4 contacts			
AJ-8890-2	AJ-8890-A2	2	1 17/32	13/16	AJ-8890-18	AJ-8890-A18	18	3 25/32	3 1/16
-4	-A4	4	1 13/16	1 3/32	-20	-A20	20	4 1/16	3 11/32
-6	-A6	6	2 3/32	1 3/8	-22	-A22	22	4 11/32	3 5/8
-8	-A8	8	2 3/8	1 21/32	-24	-A24	24	4 5/8	3 29/32
-10	-A10	10	2 21/32	1 15/16	-26	-A26	26	4 29/32	4 3/16
-12	-A12	12	2 15/16	2 7/32	-28	-A28	28	5 3/16	4 15/32
-14	-A14	14	3 7/32	2 1/2	-30	-A30	30	5 15/32	4 3/4
-16	-A16	16	3 1/2	2 25/32					

AJ-8891



NOTES:

1. Max. operating characteristics: (a) Voltage—300 RMS. (b) Current—10 Amperes continuous. 20 Amperes continuous with 12 gage cable. (c) Speed of rotation—1500 RPM.
2. Wire leads are 16 gage per spec. Mil-W-16878 Type E Teflon. Other wire sizes and types are available upon request.
3. For four (4) brush contacts per ring add two (2) brush block assemblies at 180° from position shown.
4. Brush contact pressure to be 1½ to 3½ oz.
5. For less than eight (8) rings one (1) mounting bracket is used per brush block assembly.

BREEZE PART No.		no. of rings	A	B	BREEZE PART No.		no. of rings	A	B
2 contacts	4 contacts				2 contacts	4 contacts			
AJ-8891-2	AJ-8891-A2	2	1 17/32	13/16	AJ-8891-18	AJ-8891-A18	18	3 25/32	3 1/16
-4	-A4	4	1 13/16	1 3/32	-20	-A20	20	4 1/16	3 11/32
-6	-A6	6	2 3/32	1 3/8	-22	-A22	22	4 11/32	3 5/8
-8	-A8	8	2 3/8	1 21/32	-24	-A24	24	4 5/8	3 29/32
-10	-A10	10	2 21/32	1 15/16	-26	-A26	26	4 29/32	4 3/16
-12	-A12	12	2 15/16	2 7/32	-28	-A28	28	5 3/16	4 15/32
-14	-A14	14	3 7/32	2 1/2	-30	-A30	30	5 15/32	4 3/4
-16	-A16	16	3 1/2	2 25/32					

SECTION

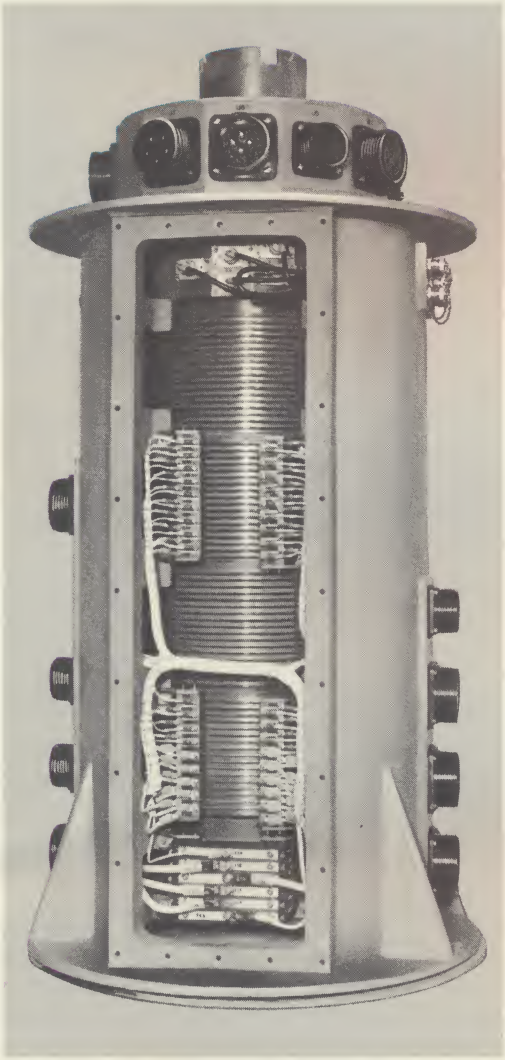
6

CUSTOM SLIP RING ASSEMBLIES

Breeze has designed and built custom slip ring assemblies for the following types of applications and having the operating characteristics shown. Breeze slip ring assemblies are the subject of a continuous research program on slip ring design, ring and brush materials, methods of shielding and dielectric materials to constantly improve and upgrade their performance.

For General Purpose Control Power

PROJECT 8438



A flat fabricated ring assembly for transmission of control and power circuits in missile guidance radar, completely enclosed in an aluminum housing for light weight, contains 160 control rings, 12 power rings and a rotating junction box of compact size.

Operating Characteristics *of Breeze Slip Ring Assemblies for General Purpose Control and Power.*

A) CONTROL

VOLTAGE: 1 volt or less to 1000 volts or more.

FREQUENCY: d.c. to 1000 cps or more.

CURRENT: Less than 1 ampere to 30 amperes.

CONTACT RESISTANCE: Less than .005 ohms.

CONTACT RESISTANCE CHANGE RESULTING FROM ROTATION: less than .005 ohms.

SPEED: 0 to 1000 RPM.

CROSSTALK: 100 db at 400 cps and 200 ohm load.

AMBIENT TEMPERATURE: –65°F to 165°F.

BRUSH LIFE: 10,000 hr. at 10 RPM.

B) POWER

VOLTAGE: 28 volts to 1000 volts or more.

FREQUENCY: d.c. to 400 cps or more.

CURRENT: 30 amperes to 1000 amperes or more.

CONTACT RESISTANCE: Less than .005 ohms.

SPEED: 0 to 1000 RPM.

AMBIENT TEMPERATURE: –65°F to 165°F.

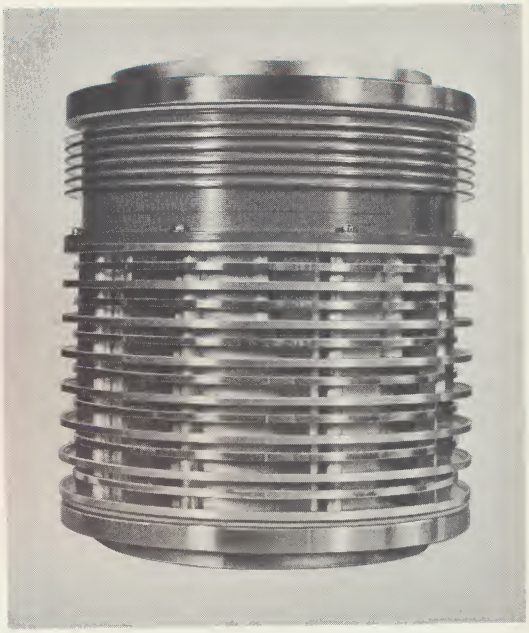
BRUSH LIFE: 10,000 hr. at 10 RPM.

SECTION 6

CUSTOM SLIP RING ASSEMBLIES

For Radio Frequency and Video

PROJECT 3276



This slip ring assembly is a combination of flat ring and cylindrical construction with 11 flat rings for control and 7 cylindrical rings to carry R. F. circuits in a radar antenna mount.

Operating Characteristics *of Breeze Slip Ring Assemblies for Radio Frequency and Video.*

VOLTAGE: 660 volts or more.

FREQUENCY: 150 megacycles.

CROSSTALK: Less than —60 db.

VOLTAGE STANDING WAVE RATIO: 1.1.

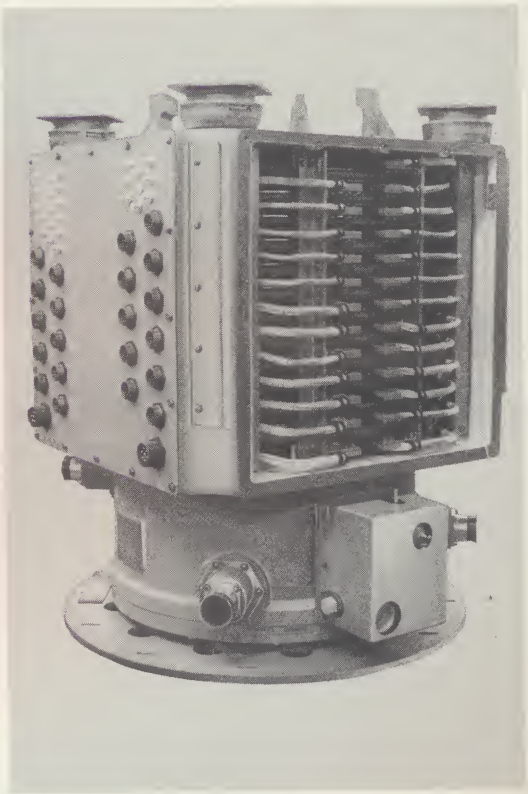
INSERTION LOSS: 0.3 db.

BRUSH LIFE: 10,000 hr. at 10 RPM.

AMBIENT TEMPERATURE: —65°F to 165°F.

For High Voltage

PROJECT 6293



A 5-ring fabricated concentric assembly. Used on a shipboard search radar antenna, the unit transmits voltages of 30 kilovolts d.c. and currents of 2 amperes.

Operating Characteristics *of Breeze Slip Ring Assemblies for High Voltage.*

VOLTAGE: 50,000 volts or higher.

FREQUENCY: d.c., power frequencies or pulse to 0.1 microsecond.

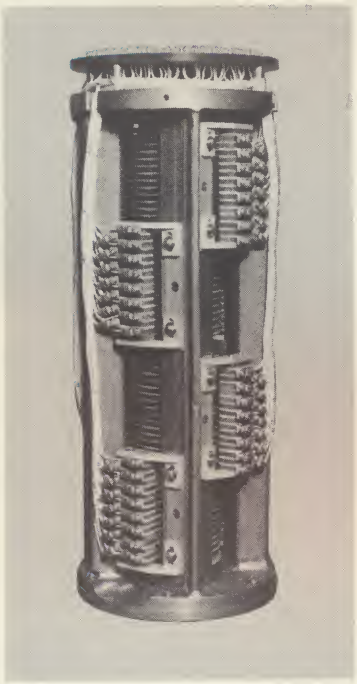
CURRENT: Less than 1 ampere to 100 amperes and over 1000 amperes pulse power.

SPEED: 0-100 RPM.

AMBIENT TEMPERATURE: —65°F to 165°F.

BRUSH LIFE: 10,000 hr. at 10 RPM.

For High Speed Instrumentation



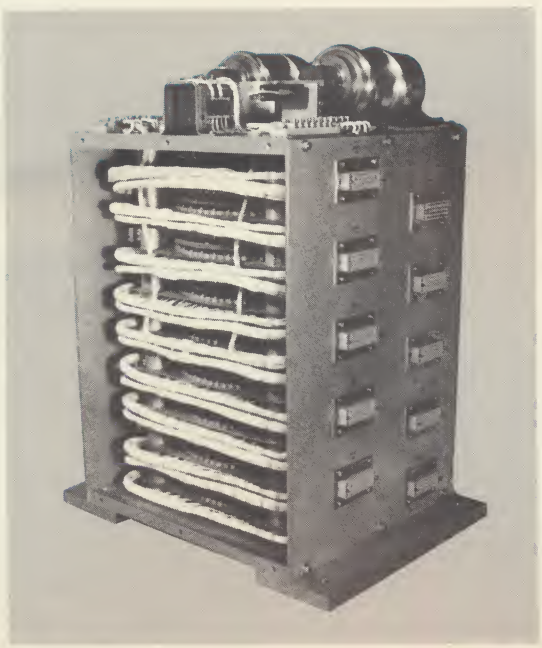
PROJECT 4327

Designed for transmission of strain gauge and temperature measuring circuits at 20,000 RPM, this unit, of flat ring type construction, includes rotating and stationary terminal boards and produces noise of under 50 microvolts at 50 milliamperes. To increase the life of the unit, brushes are retractable and brush pressure is reduced during non-recording periods.

Operating Characteristics *of Breeze Slip Ring Assemblies for High Speed Instrumentation.*

ROTATIONAL SPEED: 0 to 20,000 RPM.
LINEAR SPEED: 10,000 feet per minute.
NOISE: Less than 100 microvolts at 20,000 RPM and 50 ma. current.
NUMBER OF RINGS: 120.
BRUSH LIFE: 50 hr. at 20,000 RPM.

For Switching



PROJECT 7564

A 612 pole double throw switch that is designed to operate in set-up board search radar applications. The unit is solenoid actuated.

Operating Characteristics

1. Switching is make-after-break.
2. Low contact resistance.
3. Unit capable of carrying up to 8 amperes at 500 volts per circuit.
4. Connectors simplify installation and removal of unit.

NOTES

BREEZE CORPORATIONS, INC.
700 Liberty Avenue, Union, New Jersey 07083 • Telephone: (201) 686-4000

Slip Ring Data Form

COMPANY_____ DATE_____

ADDRESS_____ PHONE_____

NAME_____ TITLE_____

To properly specify your slip ring or rotary switch requirements, please review the accompanying catalog — then fill out this form and return with your inquiry.

GENERAL DATA

Application_____ Is unit to be self-contained? Yes ☐ No ☐

Space Envelope: Max. Length_____ Max. Dia._____ Method of Mounting_____

Leads ☐ Terminals ☐ Size_____ Length_____

OPERATING SPECIFICATIONS

No. of Rings_____

Voltage_____ Current_____ Frequency_____

R.P.M._____ Noise Requirements_____ Brush Life_____

Temp. Range_____ Atmosphere_____ Altitude_____

Vibration_____ Shock_____

Applicable Spec. (Govt. or Cust.)_____ Qual. Test Req'd Yes ☐ No ☐

COMMUTATOR

No. of Segmented Rings_____

Segments per Ring_____ Break before Make ☐ Make before Break ☐ Load — Inductive ☐ Resistive ☐

No. Continuous Rings_____ Attach schematic and timing requirements

PROVIDE ROUGH SKETCH ON OTHER SIDE OF THIS FORM

Quantities Required_____ Quotation Required by_____

Production Requirements_____ per mo._____ per year. Starting Date_____

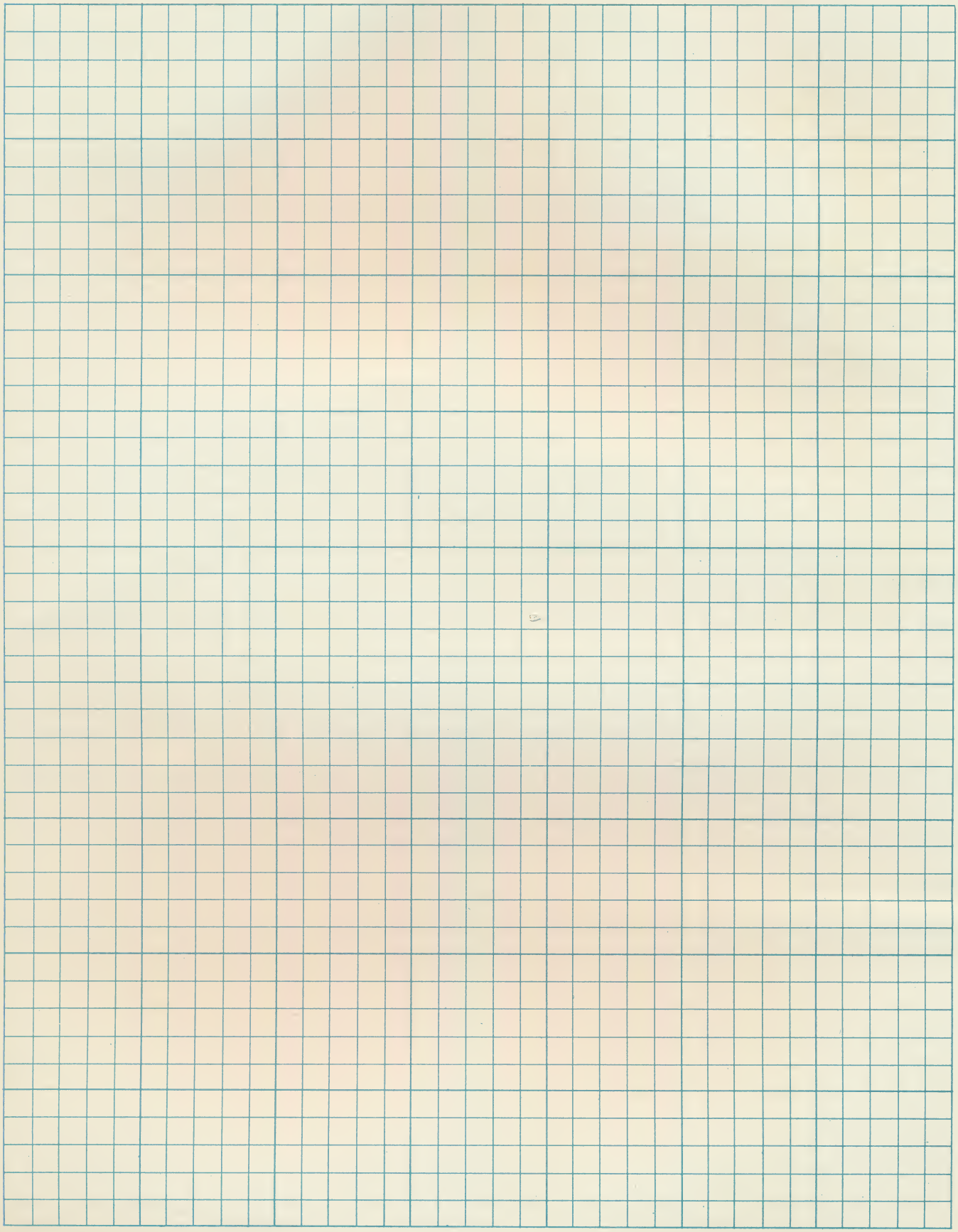
REMARKS:_____

ENCLOSE A DRAWING OR SKETCH of slip ring assembly indicating method and area for mounting purposes.

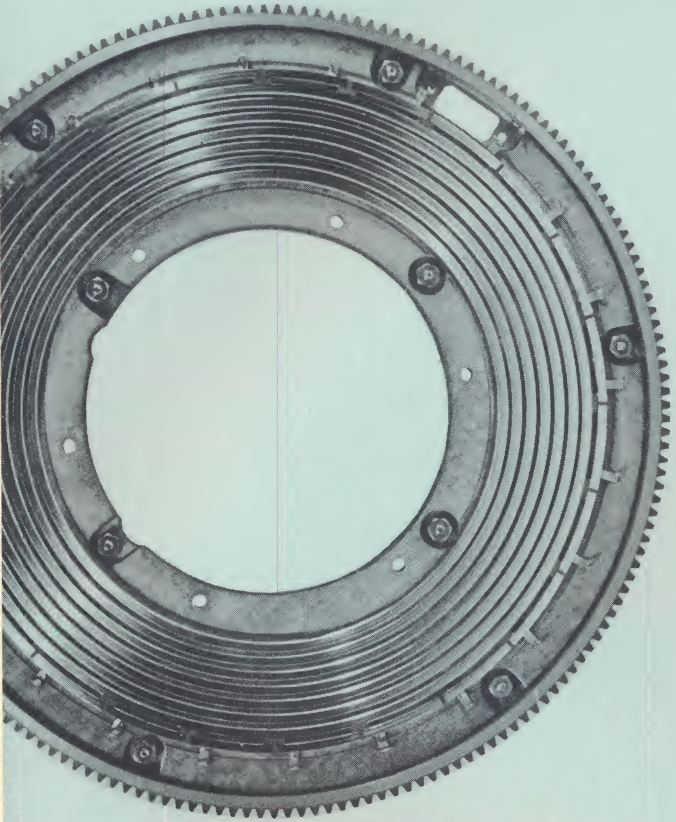
See reverse side of form ►

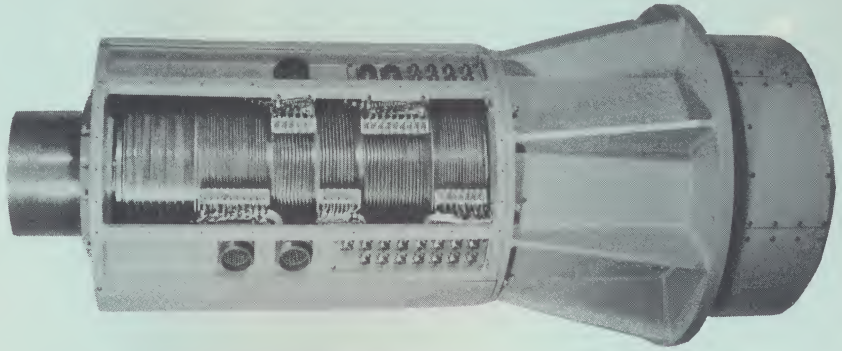
TEAR OFF AT PERFORATION

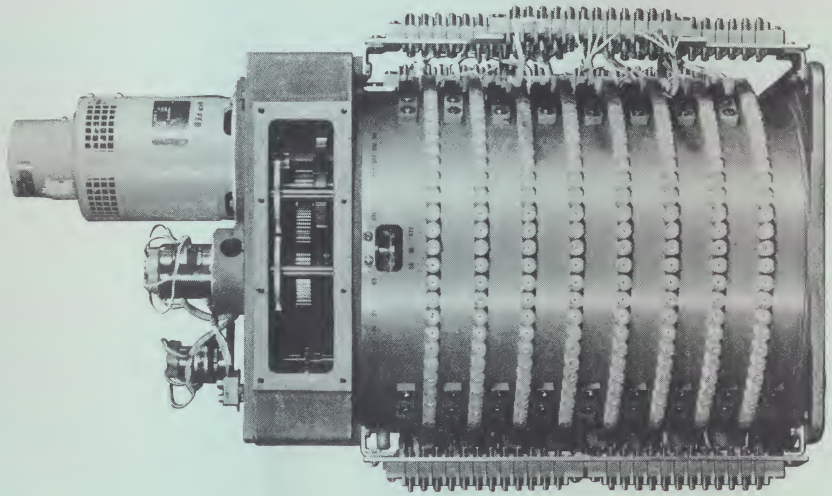
SLIP RING DATA FORM / SKETCH OF PROPOSAL

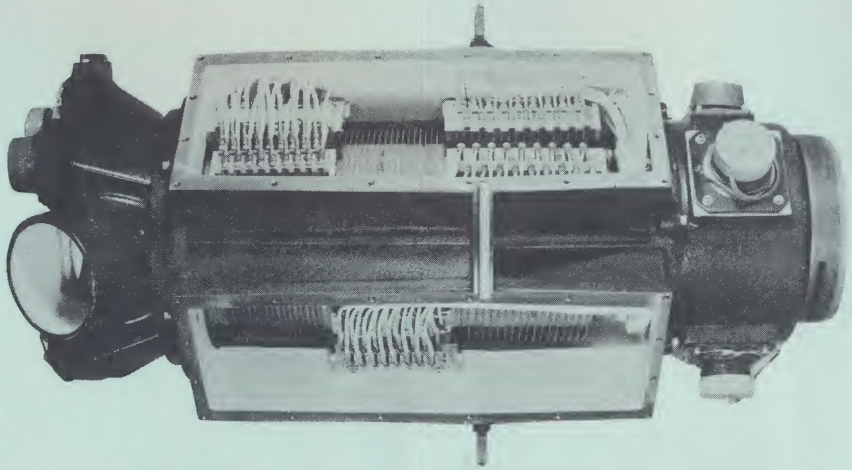


Project Number_____









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